AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A laser and optical amplifier device comprising:

a waveguide having a plurality of layers of semiconductor material with different optical indices, the waveguide including a first heightened region in a first of said layers, the first heightened region forming a channel along a longitudinal axis within which a lowest order spatial mode in both lateral and transverse directions is supported;

an active region within a second layer near the first heightened region of the waveguide that is pumped to provide gain for said lowest order spatial mode in said waveguide; and

first and second lateral regions, extending parallel to and on each side of said first heightened region along the longitudinal axis, into which all higher order spatial modes extend laterally and are suppressed, wherein the cross-sectional dimensions of the lowest order spatial mode are at least several times larger in both the transverse and lateral directions than the optical wavelength inside ~~[the]~~ a dielectric medium of the waveguide.

2. (Original) The device of claim 1 further comprising second and third heightened regions, which extend parallel to and are separated from said first heightened region along the longitudinal axis, and include absorptive regions to provide loss for higher order spatial modes.

3. (Original) The device of claim 1, wherein loss in said first and second lateral regions is generated by bombardment of all or certain layers with protons or other damage-inducing ions to provide additional loss for higher order spatial modes.

4. (Original) The device of claim 1, wherein loss in said first and second lateral regions is generated by roughening the sidewalls of the device to further suppress higher order

spatial modes.

5. (Original) The device of claim 1, wherein loss in said first and second lateral regions is generated by doping said regions to provide large free-carrier absorption which adds additional loss for higher order spatial modes.

6. (Original) The device of claim 1, wherein the cross-sectional dimensions of the lowest order spatial mode are at least an order of magnitude larger than the optical wavelength inside the dielectric medium of the waveguide.

7. (Original) The device of claim 2, wherein the cross-sectional dimensions of the lowest order spatial mode are at least an order of magnitude larger than the optical wavelength inside the dielectric medium of the waveguide.

8. (Original) The device of claim 1, wherein the contours of constant optical intensity for the lowest order spatial mode supported within said waveguide are nearly circular.

9. (Original) The device of claim 1, wherein the contours of constant optical intensity for the lowest order spatial mode supported within said waveguide have an approximately elliptical shape with a small aspect ratio.

10. (Original) The device of claim 2, wherein the contours of constant optical intensity for the lowest order spatial mode supported within said waveguide are nearly circular.

11. (Original) The device of claim 2, wherein the contours of constant optical intensity for the lowest order spatial mode supported within said waveguide have an approximately elliptical shape with a small aspect ratio.

12. (Original) The device of claim 2, wherein the first heightened region in the

waveguide is defined by a region between two parallel etched channels in said layers, and wherein said second and third heightened regions are positioned outside the two parallel etched channels.

13. (Withdrawn) A laser and optical amplifier device comprising:

a dielectric structure having a waveguide defined therein which supports only a lowest order spatial mode of propagation, the lowest order mode having a wavelength inside the dielectric medium of the waveguide at least an order of magnitude smaller than a cross-sectional dimension of said waveguide, and in which higher order spatial modes extend laterally and are suppressed; and

a quantum well region formed in parallel and adjacent to the waveguide that generates light that is confined to a lowest order mode of propagation by the waveguide.

14. (Withdrawn) The device of claim 13, wherein the contours of constant optical intensity for the lowest order spatial mode supported within said waveguide are nearly circular.

15. (Withdrawn) The device of claim 13, wherein the contours of constant optical intensity for the lowest order spatial mode supported within said waveguide have an approximately elliptical shape with a small aspect ratio.

16. (Withdrawn) The device of claim 13, wherein the dielectric structure is a layer in a semiconductor device.

17. (Withdrawn) The device of claim 13, wherein said waveguide is defined along a longitudinal axis by a region between two parallel etched channels in the dielectric structure.

18. (Withdrawn) The device of claim 17, wherein regions in the dielectric structure outside the two parallel etched channels along the longitudinal axis suppress high order modes.

19. (Original) A slab coupled optical waveguide laser comprising:

a waveguide having a plurality of layers of semiconductor material with different optical indices, the waveguide including a first heightened region in a first of said layers, the first heightened region forming a channel along a longitudinal axis within which a longitudinal lowest order spatial mode in both lateral and transverse directions is supported;

an active region within a second layer near the first heightened region of the waveguide that is pumped to provide gain for said lowest order spatial mode in said waveguide; and first and second lateral regions, extending parallel to and on each side of said first heightened region along the longitudinal axis, into which all higher order spatial modes extend laterally and are suppressed.

20. (Withdrawn) A slab coupled optical waveguide laser comprising:

a dielectric structure having a waveguide defined therein which supports a lowest order spatial mode of propagation, the lowest order mode having a wavelength inside the dielectric medium of the waveguide at least an order of magnitude smaller than a cross-sectional dimension of said waveguide, and in which higher order spatial modes extend laterally and are suppressed; and

a quantum well region formed in parallel and adjacent to the waveguide that generates light that is confined to a lowest order mode of propagation by the waveguide.

21. (Withdrawn) A laser and optical amplifier device comprising:

a dielectric structure having a waveguide defined therein which supports a lowest order spatial mode of propagation, the lowest order mode having a wavelength inside the dielectric medium of the waveguide at least several times smaller in both transverse directions than a cross-sectional dimension of said waveguide, and in which higher order spatial modes extend laterally and are suppressed; and

a quantum well region formed in parallel and adjacent to the waveguide that generates light that is confined to a lowest order mode of propagation by the waveguide.

22. (Withdrawn) The device of claim 21, wherein the contours of constant optical intensity for the lowest order spatial mode supported within said waveguide are nearly circular, having an approximately elliptical shape with a small aspect ratio.

23. (Withdrawn) The device of claim 21, wherein the dielectric structure is a layer in a semiconductor device.

24. (Withdrawn) The device of claim 21, wherein said waveguide is defined along a longitudinal axis by a region between two parallel etched channels in the dielectric structure.

25. (Withdrawn) The device of claim 24, wherein regions in the dielectric structure outside the two parallel etched channels along the longitudinal axis suppress high order modes.

26. (Withdrawn) A slab coupled optical waveguide laser amplifier device comprising: a dielectric structure having a waveguide defined therein which supports a lowest order spatial mode of propagation, the lowest order mode having a wavelength inside the dielectric medium of the waveguide at least several times smaller in both transverse directions than a cross-sectional dimension of said waveguide; and

a quantum well region formed in parallel and adjacent to the waveguide that generates light that is confined to a lowest order mode of propagation by the waveguide.

27. (Withdrawn) The device of claim 26, wherein the contours of constant optical intensity for the lowest order spatial mode supported within said waveguide are nearly circular, having an approximately elliptical shape with a small aspect ratio.

28. (Original) The device of claim 1, wherein a quantum well region provides gain.

29. (Original) The device of claim 1, wherein a quantum well region comprising one or more quantum wells, barrier layers and bounding layers provides gain.

30. (Original) The device of claim 1, wherein a strained-layer quantum well region provides gain.

31. (Original) The device of claim 1, wherein a strained-layer quantum well region comprising one or more quantum wells, barrier layers and bounding layers provides gain.

32. (Original) The device of claim 1, wherein a region containing quantum dots or quantum wires provides gain.

33. (Original) The device of claim 1 in which a region containing quantum dots or quantum wires inside one or more quantum well layers provides gain.

34. (Original) The device of claim 1, wherein gain is provided by a region containing one or more semiconductor layers.

35. (Original) The device of claim 2, wherein the regions between the first and second heightened regions and between the first and third heightened regions are filled with high resistivity material.

36. (Original) The device of claim 1, wherein plurality of layers of semiconductor

material with different optical indices are made of III-V compound semiconductors.

37. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in the $In_xGa_{1-x}As_yP_{1-y}$ semiconductor system on an InP substrate.

38. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}As$ semiconductor system on an InP substrate.

39. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in a combination of the $Al_xGa_yIn_{1-x-y}As$ and $In_xGa_{1-x}As_yP_{1-y}$ semiconductor systems on an InP substrate.

40. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_{1-x}As$ semiconductor system on a GaAs substrate.

41. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}As$ semiconductor system on a GaAs substrate.

42. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in a combination of the $Al_xGa_{1-x}As_z$ and $In_xGa_{1-x}As$ semiconductor systems on a GaAs substrate.

43. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in a the $Ga_yIn_{1-y}As_zP_{1-z}$ semiconductor systems

on a GaAs substrate.

44. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in a the $Al_xGa_yIn_{1-x-y}As_zP_{1-z}$ semiconductor systems on a GaAs substrate.

45. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in a combination of the $Al_xGa_yIn_{1-x-y}As_zP_{1-z}$ and $In_xGa_{1-x}As_yP_{1-y}$ semiconductor systems on a GaAs substrate.

46. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}As_zSb_{1-z}$ semiconductor system on an InP substrate.

47. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in a combination of the $Al_xGa_yIn_{1-x-y}As_zSb_{1-z}$ and $In_xGa_{1-x}As_yP_{1-y}$ semiconductor systems on an InP substrate.

48. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}As_zSb_{1-z}$ semiconductor system on a GaSb substrate.

49. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}As_zSb_{1-z}$ semiconductor system on an InAs substrate.

50. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}N$ semiconductor system on

a GaN substrate.

51. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}N$ semiconductor system on a sapphire substrate.

52. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}N$ semiconductor system on a SiC substrate.

53. (Original) The device of claim 1, wherein plurality of layers of semiconductor material with different optical indices are made in a the $Al_xGa_yIn_{1-x-y}As_zN_{1-z}$ semiconductor systems on a GaAs substrate.

54. (Original) The device of claim 1 wherein plurality of layers of semiconductor material with different optical indices are made of II-VI compound semiconductors.

55. (Original) The device of claim 1 wherein plurality of layers of semiconductor material with different optical indices are made of IV-VI compound semiconductors.

56. (Currently Amended) A laser and optical amplifier device comprising:

a waveguide having a first heightened region in a first layer, the first heightened region forming a channel along a longitudinal axis within which a lowest order spatial mode in both lateral and transverse directions is supported;

an active region, near the first heightened region of the waveguide, is pumped to provide gain for said lowest order spatial mode in said waveguide; and first and second lateral regions, extending parallel to and on each side of said first heightened region along the longitudinal axis, into which all higher order spatial modes extend laterally and are suppressed, wherein the cross-sectional dimensions of the lowest order spatial mode are at least several times larger in both the transverse and lateral directions than the optical wavelength inside ~~[the]~~ a dielectric medium of the waveguide.

57. (Previously Presented) The device of claim 56 further comprising second and third heightened regions, which extend parallel to and are separated from said first heightened region along the longitudinal axis, and include absorptive regions to provide loss for higher order spatial modes.

58. (Previously Presented) The device of claim 56, wherein loss in said first and second lateral regions is generated by bombardment of all or certain layers with protons or other damage-inducing ions to provide additional loss for higher order spatial modes.

59. (Previously Presented) The device of claim 56, wherein loss in said first and second lateral regions is generated by roughening the sidewalls of the device to further suppress higher order spatial modes.

60. (Previously Presented) The device of claim 56, wherein loss in said first and second lateral regions is generated by doping said regions to provide large free-carrier absorption which adds additional loss for higher order spatial modes.

61. (Previously Presented) The device of claim 56, wherein the cross-sectional dimensions of the lowest order spatial mode are at least an order of magnitude larger than the optical wavelength inside the dielectric medium of the waveguide.

62. (Previously Presented) The device of claim 57, wherein the cross-sectional

dimensions of the lowest order spatial mode are at least an order of magnitude larger than the optical wavelength inside the dielectric medium of the waveguide.

63. (Previously Presented) The device of claim 56, wherein the contours of constant optical intensity for the lowest order spatial mode supported within said waveguide are nearly circular.

64. (Previously Presented) The device of claim 56, wherein the contours of constant optical intensity for the lowest order spatial mode supported within said waveguide have an approximately elliptical shape with a small aspect ratio.

65. (Previously Presented) The device of claim 57, wherein the contours of constant optical intensity for the lowest order spatial mode supported within said waveguide are nearly circular.

66. (Previously Presented) The device of claim 57, wherein the contours of constant optical intensity for the lowest order spatial mode supported within said waveguide have an approximately elliptical shape with a small aspect ratio.

67. (Previously Presented) The device of claim 57, wherein the first heightened region in the waveguide is defined by a region between two parallel etched channels in said layers, and wherein said second and third heightened regions are positioned outside the two parallel etched channels.

68. (Previously Presented) The device of claim 56, wherein a quantum well region provides gain.

69. (Previously Presented) The device of claim 56, wherein a quantum well region

comprising one or more quantum wells, barrier layers and bounding layers provides gain.

70. (Previously Presented) The device of claim 56, wherein a strained-layer quantum well region provides gain.

71. (Previously Presented) The device of claim 56, wherein a strained-layer quantum well region comprising one or more quantum wells, barrier layers and bounding layers provides gain.

72. (Previously Presented) The device of claim 56, wherein a region containing quantum dots or quantum wires provides gain.

73. (Previously Presented) The device of claim 56 in which a region containing quantum dots or quantum wires inside one or more quantum well layers provides gain.

74. (Previously Presented) The device of claim 56, wherein gain is provided by a region containing one or more semiconductor layers.

75. (Previously Presented) The device of claim 57, wherein the regions between the first and second heightened regions and between the first and third heightened regions are filled with high resistivity material.

76. (Previously Presented) The device of claim 56, wherein said waveguide is comprised of a plurality of layers of semiconductor material with different optical indices.

77. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made of III-V compound semiconductors.

78. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $In_xGa_{1-x}As_yP_{1-y}$ semiconductor system on an InP substrate.

79. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}As$ semiconductor system on an InP substrate.

80. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in a combination of the $Al_xGa_yIn_{1-x-y}As$ and $In_xGa_{1-x}As_yP_{1-y}$ semiconductor systems on an InP substrate.

81. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_{1-x}As$ semiconductor system on a GaAs substrate.

82. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}As$ semiconductor system on a GaAs substrate.

83. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in a combination of the $Al_xGa_{1-x}As_z$ and $In_xGa_{1-x}As$ semiconductor systems on a GaAs substrate.

84. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in a the $Ga_yIn_{1-y}As_zP_{1-z}$ semiconductor systems on a GaAs substrate.

85. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in a the $Al_xGa_yIn_{1-x-y}As_zP_{1-z}$ semiconductor systems on a GaAs substrate.

86. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in a combination of the $Al_xGa_yIn_{1-x-y}As_zP_{1-z}$ and $In_xGa_{1-x}As_yP_{1-y}$ semiconductor systems on a GaAs substrate.

87. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}As_zSb_{1-z}$ semiconductor system on an InP substrate.

88. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in a combination of the $Al_xGa_yIn_{1-x-y}As_zSb_{1-z}$ and $In_xGa_{1-x}As_yP_{1-y}$ semiconductor systems on an InP substrate.

89. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}As_zSb_{1-z}$ semiconductor system on a GaSb substrate.

90. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}As_zSb_{1-z}$ semiconductor system on an InAs substrate.

91. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}N$ semiconductor system on a GaN substrate.

92. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}N$ semiconductor system on a sapphire substrate.

93. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in the $Al_xGa_yIn_{1-x-y}N$ semiconductor system on a SiC substrate.

94. (Previously Presented) The device of claim 76, wherein said plurality of layers of semiconductor material with different optical indices are made in a the $Al_xGa_yIn_{1-x-y}As_zN_{1-z}$ semiconductor systems on a GaAs substrate.

95. (Previously Presented) The device of claim 76 wherein said plurality of layers of semiconductor material with different optical indices are made of II-VI compound semiconductors.

96. (Previously Presented) The device of claim 76 wherein said plurality of layers of semiconductor material with different optical indices are made of IV-VI compound semiconductors.